

#### **School of Mechanical Engineering**

Course Code: BME01T1001 Course Name: Engineering Graphics and Introduction to Digital Fabrication

# Unit 1 Projection of Lines

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**Program Name: B.Tech First Year** 



#### Prerequisite/Recapitulations

- Drawing, Sketching
- First angle & third angle projection
- Basics of engineering graphics

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#### Learning objectives

#### To acquire knowledge about:

- Types of projection
  - Perspective
  - Oblique
  - Auxiliary
  - Orthographic
  - Isometric
- Orthographic System of Projection
- Principal Planes
- Convention for Projection
- Different cases of Projection of lines



## **Types of Projections**

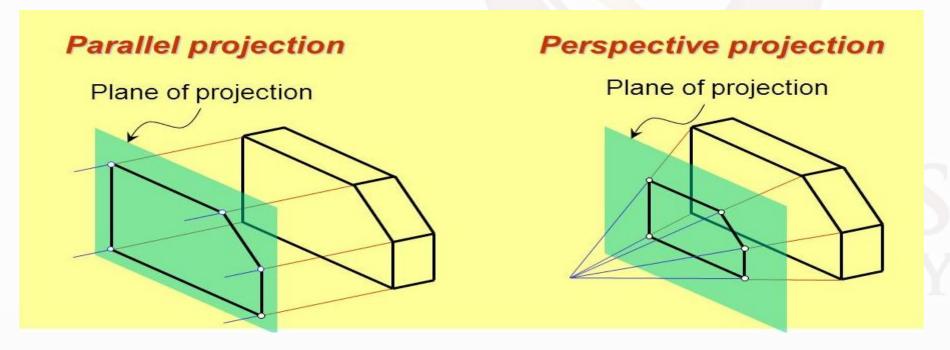
- 1. Perspective
- 2. Oblique
- 3. Auxiliary
- 4. Orthographic
- 5. Isometric





#### **Perspective Projection**

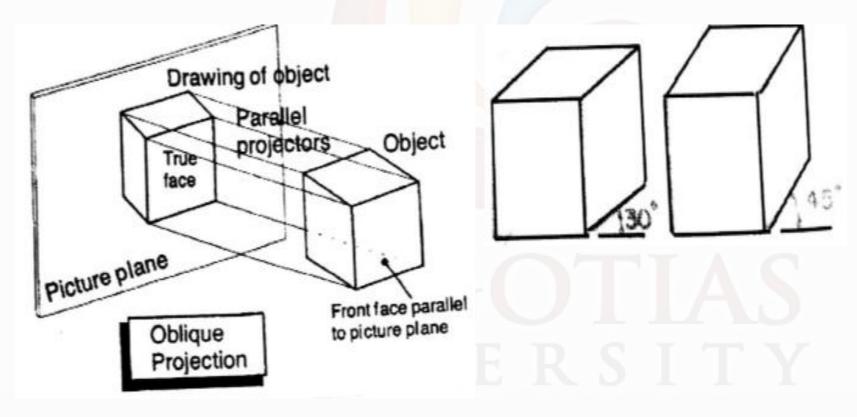
- Objects are drawn as it appears to human eye.
- Generally used for large objects such as building etc.
- The projection is obtained on a plane known as Picture Plane and the view is taken from a point known as Station Point





#### **Oblique Projection**

- In this the projectors are neither parallel nor at right angle to the picture plane.
- The size and shape of the object will change according to the angle of projector.

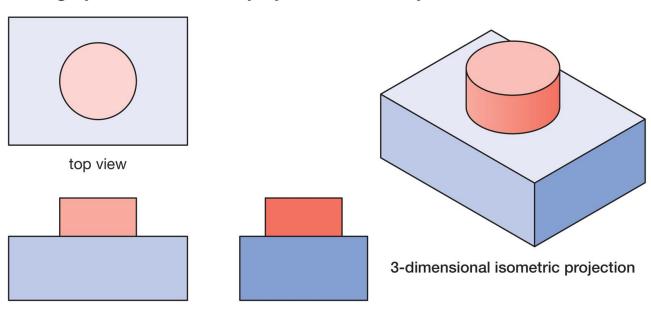




## **Orthographic Projection**

Projectors or the rays of light are parallel to each other
 And perpendicular to the picture plane

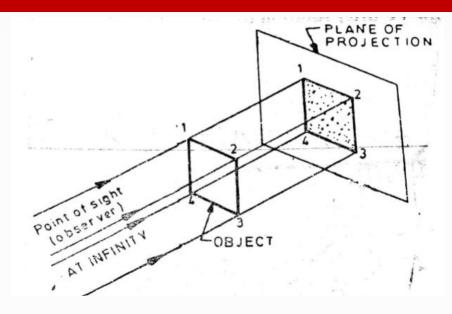
#### Orthographic and isometric projections of an object



side view



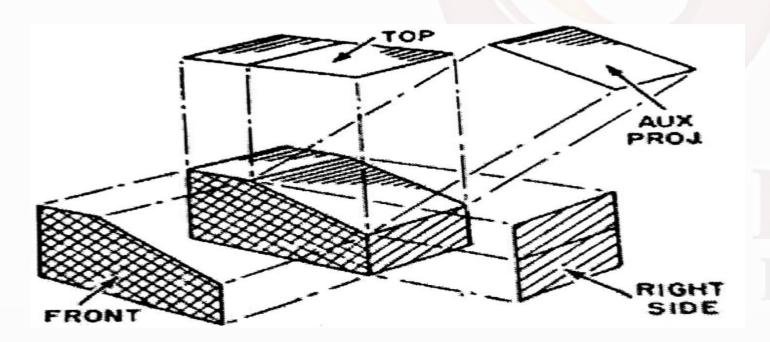
front view





#### **Auxiliary Projection**

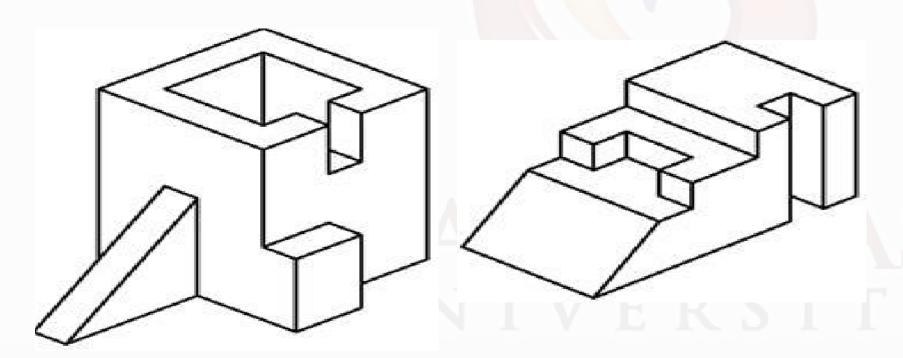
- When the edges of the object is not parallel to the principal plane, then in that case the true shape and size of the object is not projected.
- In order to show such edges and faces in their true shape and size and additional plane known as auxiliary plane is used.





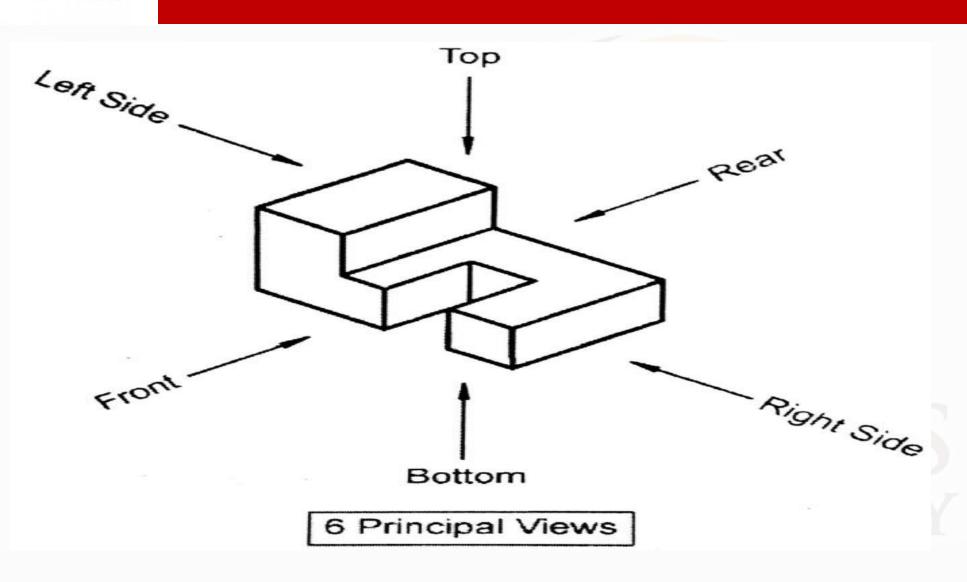
#### **Isometric Projection**

**Isometric projection** is a method for visually representing three-dimensional objects in two dimensions in technical and engineering drawings. It is an axonometric projection in which the three coordinate axes appear equally foreshortened.





### **Six Principal Views**



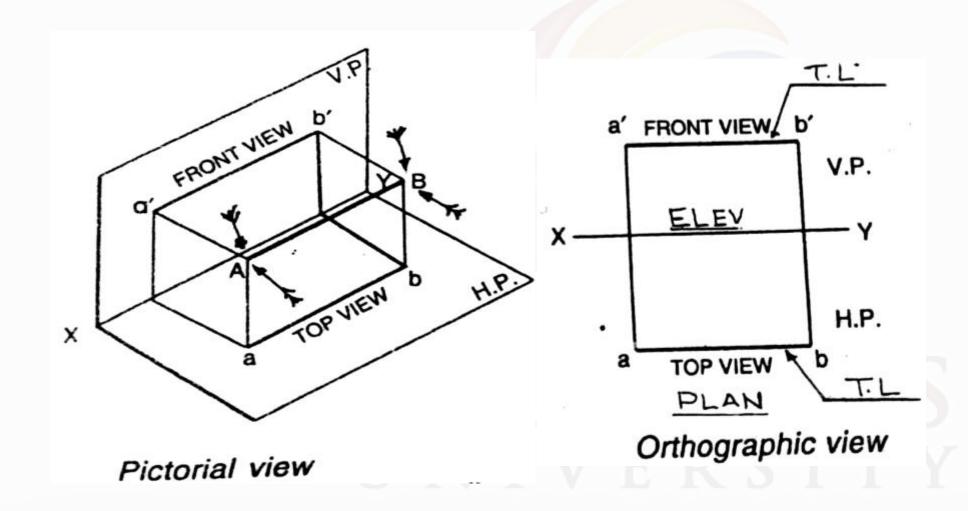


#### **Different Cases of Projection of Straight Line**

- Straight line parallel to H.P. and V.P.
- Straight line perpendicular to H.P. and parallel V.P.
- Straight line parallel to H.P. and perpendicular to V.P.
- Straight line in H.P.
- Straight line in V.P.
- Straight line in H.P. And V.P.
- Straight line inclined to H.P. and parallel V.P.
- Straight line inclined to V.P. and parallel H.P.
- Straight line inclined to H.P. and V.P.

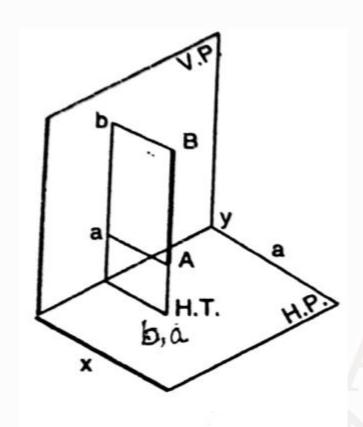


#### Straight line parallel to H.P. and V.P.

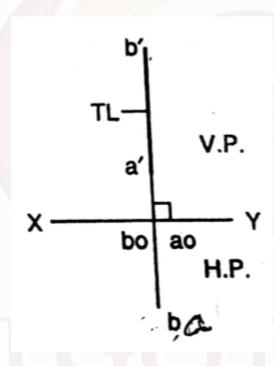




#### Straight line perpendicular to H.P. and parallel V.P.



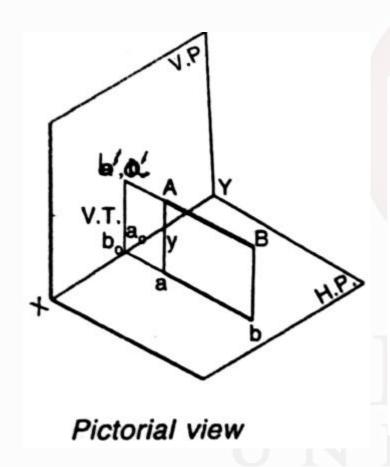
Pictorial view



Orthographic views



### Straight line parallel to H.P. and perpendicular to V.P.



x - b, a v.P.

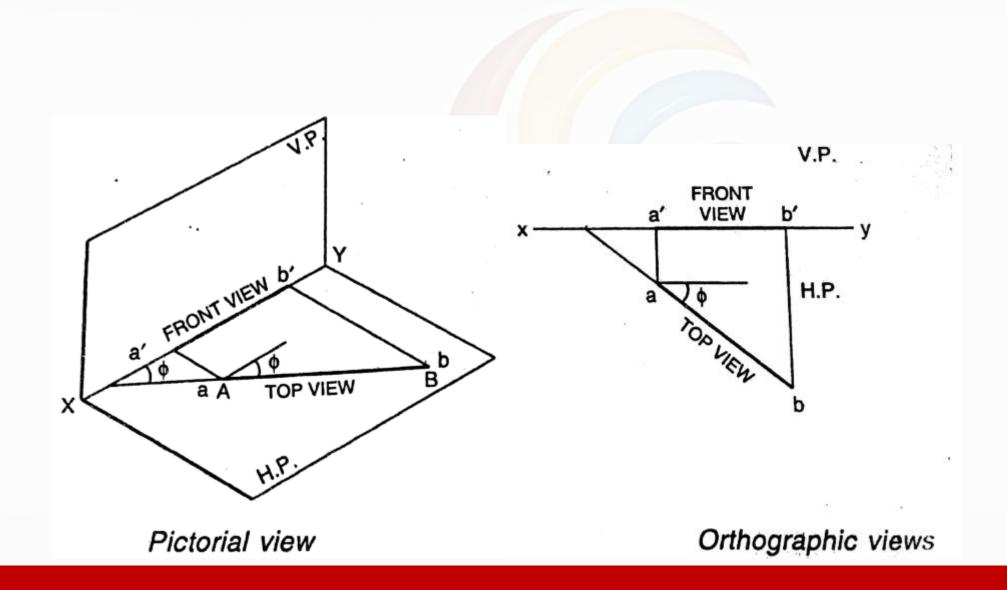
b, a v.P.

TL- H.P.

Orthographic views

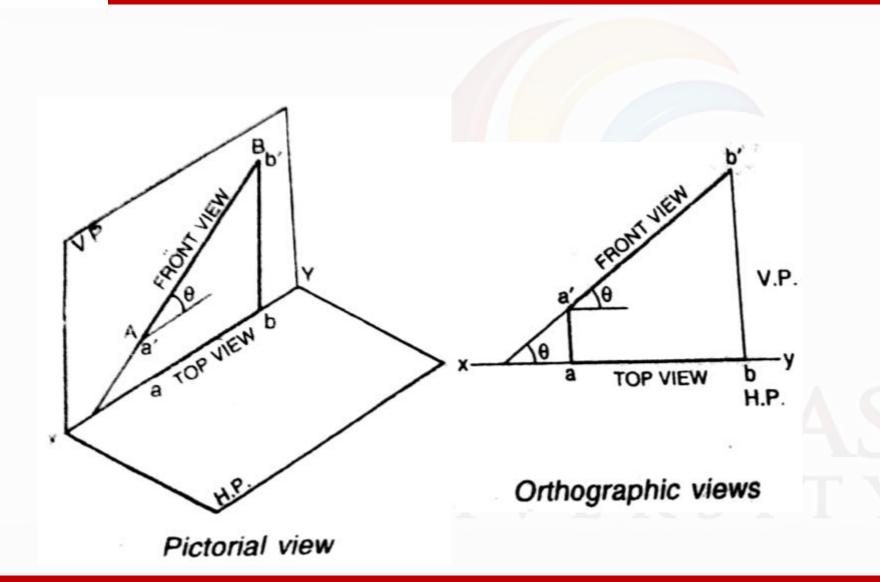


### **Straight Line in H.P.**



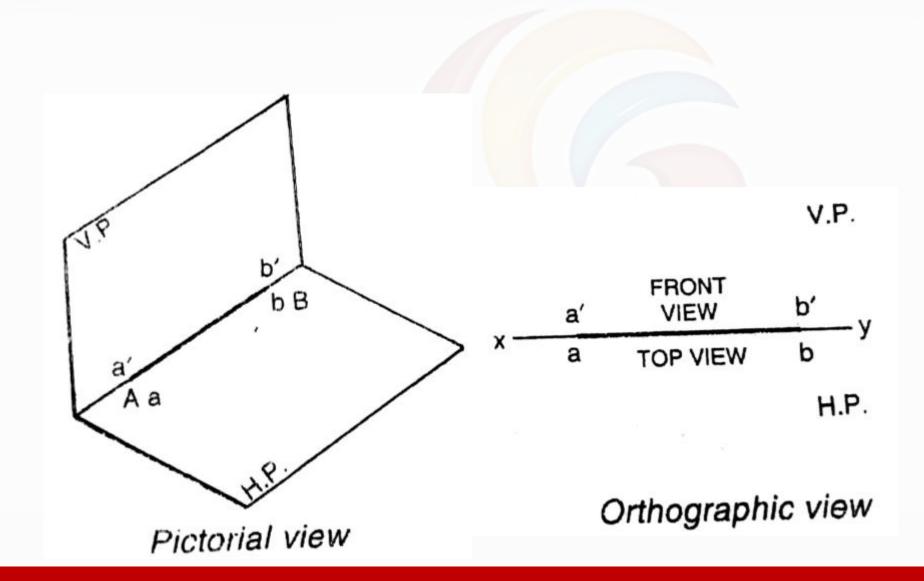


### Straight Line in V.P.



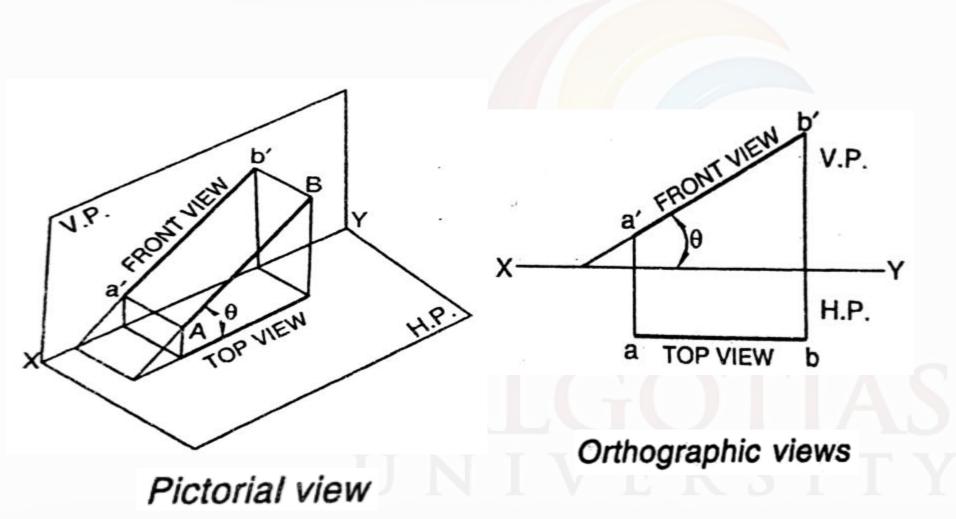


### Straight Line in H.P. and V.P.



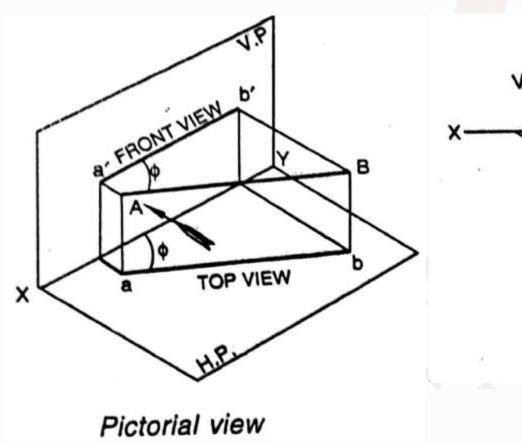


#### Straight line inclined to H.P. and parallel V.P.





#### Straight line inclined to V.P. and parallel H.P.

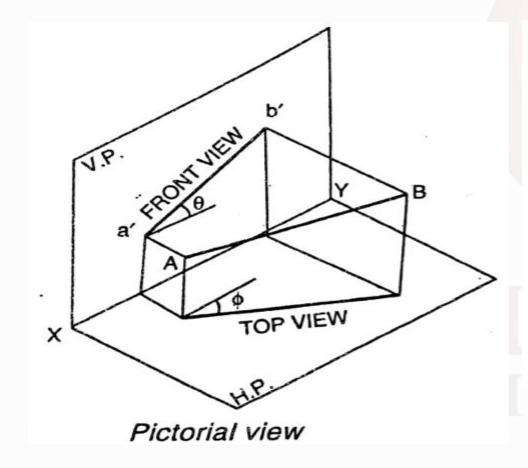


A FRONT VIEW b'

Orthographic views



#### Straight Line inclined to H.P. and V.P.



V.P. a' FRONT VIEW b' H.P.

Orthographic views



#### **Video for Visualization**



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#### **Summary**

#### Learners are able to draw:

- Straight line parallel to H.P. and V.P.
- Straight line perpendicular to H.P. and parallel V.P.
- Straight line parallel to H.P. and perpendicular to V.P.
- Straight line in H.P.
- Straight line in V.P.
- Straight line in H.P. And V.P.
- Straight line inclined to H.P. and parallel V.P.
- Straight line inclined to V.P. and parallel H.P.
- Straight line inclined to H.P. and V.P.



#### **Questions**

- **❖ How do you explain the t**ypes of projection:
  - Perspective
  - Oblique
  - Auxiliary
  - Orthographic
  - Isometric
- **\*** Explain the orthographic system of projection
- **\*** Explain the principal planes
- Write the convention for projection
- Explain the different cases of projection of lines

#### References



- Engineering Drawing by N. D. Bhatt and V. M. Panchal
- Engineering Graphics by K. C. John
- **ONPTEL**

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